

A New Cottid Species, *Artediellus neyelovi*, from the Southeastern Coast of the Oshima Peninsula, Hokkaido, Japan

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Abstract A new cottid species, *Artediellus neyelovi*, is described on the basis of 39 specimens collected from southeastern coast of the Oshima Peninsula, Hokkaido, Japan. The species is distinguished from all other members of the genus by the following combination of characters: simple sharp nasal spines, 28–33 lateral line pores, numerous pores in the cephalic sensory system, numerous head cirri, elongate dorsal fin spines of the male, a pale first dorsal fin with a few blown blotches, and 2 or 3 vertical bars on caudal fin.

Fishes of the cottid genus *Artediellus* Jordan are characterized by having a strongly hooked spine on the preopercle, teeth on the palatine and prevomer, one spine and three soft rays in the pelvic fin, a single row of lateral line pores, and a scaleless body except for lateral line scales under the skin. Twelve species, distributed in the North Pacific, North Atlantic, and Arctic oceans, are recognized in the genus, 5 of which are found in Japan (Nelson, 1986). Thirty nine specimens of an undescribed species of *Artediellus* were recently collected from the southeastern coast of the Oshima Peninsula, Hokkaido, Japan. This species has been misidentified as *A. ochotensis* Gilbert and Burke by Amaoka et al. (1989), with which it shares some characters. It is described below as a new to science.

The specimens examined here are deposited in the Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University (HUMZ); Department of Zoology, National Science Museum, Tokyo, Japan (NSMT-P); Museum National d'Histoire Nature, Laboratoire d'Ichtyologie, Paris, France (MNHN); and National Museum of Natural History (USNM). Methods for making counts and measurements follow Hubbs and Lagler (1958) and Yabe (1991). Vertebrae and caudal fin rays were counted from radiographs. Sex was determined by examination of gonads. Terminology for describing head cirri and the cephalic sensory system follows Nelson (1986).

Artediellus neyelovi sp. nov.

(New Japanese name: Oshima-oki-kajika)

(Figs. 1–3)

Artediellus ochotensis (not of Gilbert and Burke, 1912) Amaoka, Nakaya, and Yabe, 1989: 265 (42°04'N, 141°07'E, depth 115 m, off Minami-kayabe, southeastern coast of the Oshima Peninsula, Hokkaido; misidentification, listed).

Holotype. HUMZ 103874, male, 85.1 mm SL, 41°57'N, 141°08'E, depth 137 m, eastern end of Tsugaru Strait, 6 Sept. 1984.

Paratypes. Thirty eight specimens. HUMZ 93974, male, 89.3 mm SL, 41°54'N, 140°57'E, depth 80 m, off Usujiri, southeastern coast of Oshima Peninsula, Hokkaido, 13 Oct. 1981. HUMZ 96598–96601, 96628, MNHN 1994-507, 1994-508, NSMT-P 45944, 3 males and 5 females, 68.0–89.5 mm SL, 42°00'N, 141°01'E, depth 96 m, off Minami-kayabe, southeastern coast of Oshima Peninsula, Hokkaido, 21 July 1982. HUMZ 99540, 100981–100988, 100990, 101261–101267, USNM 330305, 3 males, 12 females, and 3 young fishes, 42°03'N, 141°01'E, depth 93 m, off Minami-kayabe, southeastern coast of Oshima Peninsula, Hokkaido, 25 Aug. 1983. HUMZ 103849, female, 85.0 mm SL, 42°04'N, 141°07'E, depth 115 m, off Minami-kayabe, southeastern coast of Oshima Peninsula, Hokkaido, 5 Sept. 1984. HUMZ 103876–103879, 103881, NSMT-P 45944, USNM 330306, 4 males and 3 females, 73.0–91.1 mm SL; collected with holotype. HUMZ 103948, male, 81.5 mm SL, 41°58'N, 141°09'E, depth 137 m, eastern end of Tsugaru Strait, 6 Sept. 1984. HUMZ 103976, male, 66.7 mm SL, 42°00'N, 141°13'E, depth 91 m, off Minami-kayabe, southeastern coast of Oshima Peninsula, Hokkaido,

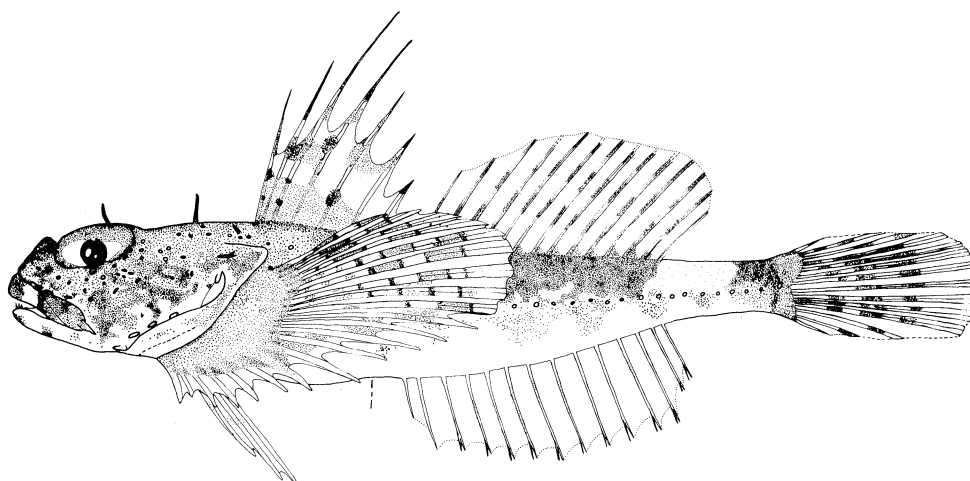


Fig. 1. *Artediellus neyelovi* sp. nov., holotype, HUMZ 103874, male, 85.1 mm SL, from the eastern end of Tsugaru strait, southeastern coast of the Oshima Peninsula, Hokkaido, Japan, 41°57'N, 141°08'E.

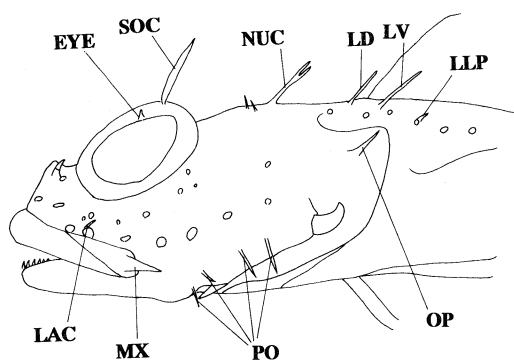


Fig. 2. Head cirri of *Artediellus neyelovi* sp. nov., paratype, HUMZ 103876, 87.0 mm SL. *EYE*—eye cirrus; *LAC*—lacrimal cirrus; *LD*—dorsal lateral cirrus; *LLP*—lateral line cirrus; *LV*—ventral lateral cirrus; *MX*—maxillary cirrus; *NUC*—nuchal cirrus; *OP*—opercular cirrus; *PO*—preopercular cirri; *SOC*—supraorbital cirrus.

6 Sept. 1984. HUMZ 103990, female, 82.6 mm SL, 42°04'N, 141°04'E, depth 100 m, off Minami-kayabe, southeastern coast of Oshima Peninsula, Hokkaido, 5 Sept. 1984.

Diagnosis. A member of the genus *Artediellus* having the following combination of features. Nasal spine simple, sharp; nuchal tubercles or spine absent. Posterior portion of suborbital stay elongate and slender. Five supraorbital pores, unpaired except posterior most. Terminal pores of mandibular canal paired. Terminal pores of preopercular canal repre-

sented by a cluster of four small pores. Supplementary pores well developed on cephalic sensory canal. Numerous, delicate, darkly pigmented cirri on eye, head, and dorsal side of body above pectoral fin base. Lateral line pores 28–33. Vertebrae 9–12 + 20–23 = 30–33.

Description. Counts and proportional measurements are given in Tables 1 and 2. Body stout, depressed anteriorly, somewhat compressed posterior to anal fin origin; body depth 1.5 (1.2–1.7 in paratypes) in width. Caudal peduncle moderately deep, its depth 2.0 (1.8–2.5) in its length. Head modelately depressed. Mouth terminal, maxilla reaching vertical below middle of pupil. Teeth on prevomer and palatine small, sharp, and slightly curved medially. Snout short and rounded, its length 1.4 (1.3–1.9) in orbital diameter. Nasal spine simple, sharp. Anterior nasal tube shorter than nasal spine but longer than posterior nasal tube; posterior nasal tube extremely short. Eye moderate in size, orbital diameter 3.3 (2.8–3.4) in head length. Interorbital space narrow, moderately concave, its width 6.6 (5.3–8.2) in orbital diameter. Upper preopercular spine curved dorsally at distal tip, without denticles (a small denticle on inner margin in some paratypes); lower preopercular spine sharp, directed antero-ventrally. Urogenital papilla extremely small. Lateral line forming a flat curve. Lateral line scales gutter-shape, present under skin between lateral line pores.

First dorsal fin extremely high in males, tip of

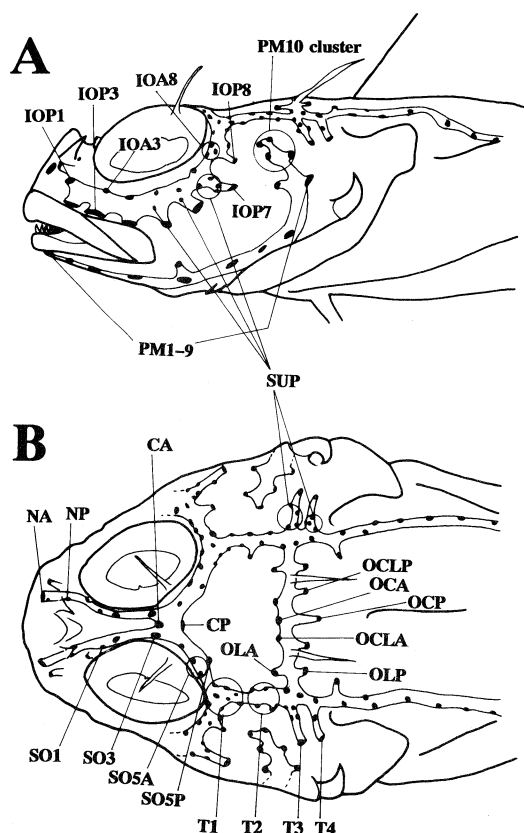


Fig. 3. Cephalic seismosensory system of *Artedius neyelovi* sp. nov., holotype, HUMZ 103874. A) Lateral view; B) dorsal view. CA—anterior coronal pore; CP—posterior coronal pore; IOA—anterior infraorbital pores; IOP—posterior infraorbital pores; NA—anterior nasal pore; NP—posterior nasal pore; OCA—anterior medial pore of occipital canal; OCLA—lateral anterior central pore of occipital canal; OCLP—lateral posterior central pore of occipital canal; OCP—posterior medial pore of occipital canal; SO—supraorbital pores; SUP—supplementary pores; T—postorbital pores.

spines almost filamentous except posterior two, 3rd (4th in some paratypes) spine longest, fin membrane deeply incised. Dorsal fin low in female, fin membrane moderately incised; length of longest spine 1.5 (1.2–2.2 in males, 0.7–1.0 in females and young fishes) in base of first dorsal fin. Longest dorsal fin spine of females are constant with growth, but those of males tend to elongate with growth (Fig. 4). Base of first dorsal fin 1.6 (1.4–1.9) in base of second dorsal fin. Second dorsal fin separated from first dorsal fin by short interspace; origin above midpoint

between anus and anal fin origin; all rays except anterior 1 (1–4) weakly branched at distal end. Anal fin origin approximately under base of 2nd ray of dorsal fin, last ray below a little posterior to the last ray of second dorsal fin; rays except anterior 2 (1–5) weakly branched near tips; base 1.0 (0.9–1.1) in second dorsal fin base. Uppermost ray of pectoral fin unbranched (branched in some paratypes); 2nd to 9th (7th–12th) rays branched; lower rays unbranched; 7th ray (6th or 8th in some paratypes) longest, 2.8 (2.6–3.0 in males, 2.9–3.5 in females) in SL. Innermost ray (middle ray in some paratypes) of pelvic fin longest, its length 4.3 (4.0–4.6 in males, 4.4–5.5 in females) in SL. Caudal fin margin slightly rounded, length 3.9 (3.5–4.9) in SL; 12 rays on hypural complex; uppermost 1 and lowermost 2 rays unbranched; procurrent rays 9 (9–10) upper and 7 (6–7) lower.

Cirri on head and anterior body (Fig. 2): supraocular (SOC), nuchal (NUC), opercular (OP), maxillary (MX), lateral line pore (LLP), and eye (EYE) cirri always present. Ventral lateral cirrus (LV) usually present. Small lacrimal cirrus (LAC) present except in 4 paratypes. Dorsal lateral cirrus (LD) present only on holotype and a few paratypes. Shape of cirrus ribbon-like (bifurcate NUC in some paratypes) except EYE. Supraocular and nuchal cirri larger than others; opercular and maxillary cirri moderate in length; others small. Eye cirrus ("cirri" in some paratypes) present as a granule on lowest edge of iridic membrane.

Pores on cephalic sensory system (Fig. 3): first to 5th pores of supraorbital canal (SO1–5) present, 5th pore subdivided into anterior and posterior part (SO5A, SO5P). First to 8th posterior (IOP1–8) and 3rd to 8th anterior (IOA3–8) pores of infraorbital canal present, canaliculi and supplementary pores developed on IOP5–8. Anterior (CA) and posterior (CP) coronal pores present. Ten pores with canaliculi present on occipital canal (OCA, OCP, OCLA, OCLP, OLA, and OLP). Third and 4th postorbital canal (T3 and T4) long, 3rd one slightly longer or same length as 4th, and supplied with a few supplementary pores. Irregular supplementary pores on T1 and T2. First to 10th preopercular-mandibular pores (PM1–10) present; PM5 with a superior pore (2 pores in some paratypes) with a canaliculus; PM9 divided into 2 parts (PM9A and PM9P), PM9A with canaliculus and PM9P with or without short canaliculus; PM10 subdivided into 4 (3–5) small pores with or without canaliculi. The anterior most

pores of mandibular canal (PM1) of both sides not fused, apparently paired.

Color in alcohol.—Body yellowish brown, with 3 darker brown saddles: head to under first dorsal fin, under second dorsal fin, on caudal peduncle. Few irregularly shaped, dark brown blotches on sides. Top and sides of head patched dark brown. Ventral surface of head usually pale. Upper portion of eye

dark brown. Two dark brown blotches on upper jaw. Ventral side of body pale. First dorsal fin pale with a few irregular dark brown blotches, tip of spine and fin base dark brown. Second dorsal fin yellowish white with 4–5 oblique brown bars. Pectoral fin usually light brown with large brown blotch on base and 4–5 brown blotches on each ray. Anal and pelvic fins light brown on middle part or uniformly

Table 1. Proportional measurements of *Artediellus neylovi* sp. nov., expressed in percents of SL

	Holotype HUMZ 103874	Holotype + 38 Paratypes	
		Mean	Range
Standard length (mm)	85.1	77.2	53.3–91.1
Body depth	17.3	17.7	13.8–21.8
Body depth at anus	14.7	15.0	11.0–17.9
Body width	26.7	25.8	20.3–30.5
Predorsal length	34.3	34.2	30.6–37.2
Preanal length	54.2	54.8	50.4–59.2
Prepelvic length	26.6	27.4	25.1–30.0
Caudal peduncle length	12.5	13.2	11.0–15.5
Caudal peduncle depth	6.2	6.1	5.2–6.9
Head length	35.8	37.2	34.6–40.3
Snout length	7.6	8.1	6.4–10.7
Orbital diameter	10.8	12.1	10.5–13.8
Upper jaw length	16.5	15.7	13.7–17.2
Interorbital width	1.6	1.9	1.4–2.4
First dorsal fin base	20.6	20.6	17.8–24.0
Second dorsal fin base	33.7	33.6	31.0–36.7
Anal fin base length	34.9	33.2	30.8–36.1
Longest pectoral fin ray	35.1	33.0	28.8–38.5
Caudal fin length	25.6	25.0	20.5–28.9

Table 2. Frequency distributions of counts of *Artediellus neylovi* sp. nov.

Dorsal fin spines				Dorsal fin rays				
7	8	9	10	13	14	15	16	
2	33*	3	1	11	24*	3	1	
Anal fin rays				Pectoral fin rays				
12	13	14	16	20	21	22	23	24
1	20	17*	1	2	4*	25	7	1
Lateral line pores								
28	29	30	31	32	33			
6	14*	14	3	1	1			
Vertebrae (abdominal v. + caudal v.)								
9+21	10+20	10+21	10+23	11+20	11+21	12+20		
2	8	20*	1	5	2	1		

* Includes holotype.

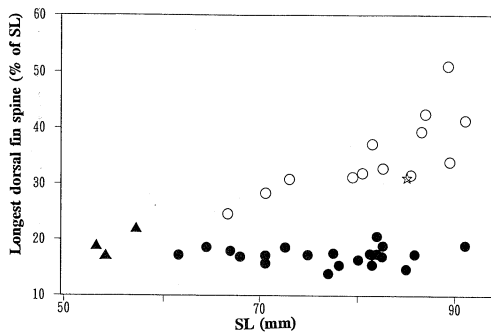


Fig. 4. Relationship of length of longest dorsal fin spine and standard length of *Artediellus neyelovi* sp. nov. ☆, holotype; ○, males; ●, females; ▲, young fishes.

black in males; pale or slightly brown on the middle part in females. Caudal fin with 2 or 3 vertical brown bars. Cirri darkly pigmented except MX, LAC, and some PO. Some males having darker coloration; deeply pigmented on fins and ventral side of head, pectoral fin black with 4 oblique white bands or blotches.

Distribution. Known from the sublittoral zones, 80–113 m in depth, near Minami-kayabe and eastern end of Tsugaru Strait, southeastern coast of Oshima Peninsula, Hokkaido, Japan.

Etymology. The specific name is in honor of Professor Alexei Vadimovich Neyelov of the Zoological Institute, Russian Academy of Science (Sankt Petersburg), who has contributed greatly to system-

atic studies of cottid fishes.

Note. All females collected in early September have eggs, that can be felt from the outside of the bodies. The eggs are 1.6–1.8 mm in diameter. Usually there is no denticle on the inner margin of the upper preopercular spine; however, a denticle is present in most specimens smaller than 70.6 mm SL (9 in 11 specimens) while a blunt denticle is present in a larger specimens (4 in 28). In the other specimens, a subdermal denticle in the upper spine can be seen in using strong light.

Comparison. According to Nelson (1986), the genus *Artediellus* includes 12 species. It is divided into two subgenera: *A. (Artediellops)* with 2 spp. and *A. (Artediellus)* with 10 spp., each diagnosed by Neyelov (1979) and Nelson (1986). *Artediellus neyelovi* differs in having two preopercular spines from *A. dydymovi* Soldatov and *A. fuscimentus* Nelson, both recognized as members of the former subgenus. Within the subgenus *Artediellus*, *A. neyelovi* differs from *A. miacanthus* Gilbert and Burke, *A. scaber* Knipowitch and *A. aporosus* Soldatov in having large nasal spines (Gilbert and Burke, 1912; Schmidt, 1927; Andriashev, 1961; Neyelov, 1979; Nelson, 1986). *Artediellus neyelovi* differs from *A. camchaticus* Gilbert and Burke, which has a few small cirri on head, no supplementary pores, a single PM10, 2 pores on the supraorbital canal (SO2 and SO5P), indistinct darker bars on body, caudal peduncle depth less than 35% of its length (Gilbert and Burke, 1912; Andriashev, 1961; Neyelov, 1979;

Table 3. Presence (+) or absence (–) of pores of head seismosensory system in eleven species of the subgenus *Artediellus*. SO1, 1st pore of supraorbital canal; SO3, 3rd pore of supraorbital canal; IOA, anterior pores of infraorbital canal; OCLA, lateral anterior central pore of occipital canal; OCLP, lateral posterior central pore of occipital canal; SUP, supplementary pores

	SO1	SO3	IOA	OCLA	OCLP	SUP
<i>A. neyelovi</i> sp. nov.	+	+	+	+	+	+
<i>A. ingens</i> *	+	+	+	+	+	+
<i>A. ochotensis</i>	+	–	+	+	+	– or +
<i>A. gomojunovi</i> **	–	–	+	+	+	–
<i>A. camchaticus</i>	–	–	+	– or +	– or +	–
<i>A. miacanthus</i> **	–	–	–	–	–	–
<i>A. pacificus</i> **	–	–	+	–	–	–
<i>A. atlanticus</i> **	–	–	–	–	–	–
<i>A. uncinatus</i> **	–	–	–	–	–	–
<i>A. scaber</i> **	–	–	– or +	–	–	–
<i>A. aporosus</i> **	–	–	–	–	–	–

*Data from Nelson (1986); **data from Neyelov (1979).

Nelson, 1986), and a posterior nasal tube as long as anterior one in comparative material of *A. camchaticus*. *Artediellus neyelovi* is similar to *A. ingens* in the condition of the cephalic sensory system as described by Nelson (1986) (Table 3). Even some paratypes of *A. neyelovi* have many supplementary pores on OC canaliculus like *A. ingens*. However, according to Nelson's (1986) description, *A. neyelovi* differs from *A. ingens* in that the latter is characterized by having a few head cirri, low and not deeply incised first dorsal fin (in both sexes) which is uniformly dark brown or black marginally, a caudal fin with 4–5 vertical blown bars, and maximum body size of over 110 mm SL. Nelson (1986) reported that some female specimens of *A. ingens* had eggs about 3.5 mm in diameter. These egg sizes are about 2 times those of *A. neyelovi* (1.6–1.8 mm). *Artediellus neyelovi* resembles *A. ochotensis* in having many head cirri, but differs from the latter characterized by having few supplementary pores, no SO3 pore, and a large spot on the posterior part of the first dorsal fin of the male (Gilbert and Burke, 1912; Schmidt, 1927; Andriashev, 1961; Neyelov, 1979). The shapes of the cirri are very different. Those of *A. neyelovi* are filamentous and ribbon-like, but those of *A. ochotensis* are thick and conical. Absence of SO1 pore in *A. ochotensis* described by Neyelov (1979) was considered as discriminating character from *A. neyelovi*, but our specimens of *A. ochotensis* have it. Males of *A. neyelovi* differ from those of *A. ochotensis* by having elongated spines of dorsal fin (longest spine 24.6–52.1% of SL [usually 30% or more] vs. 18.5–23.2% in comparative materials of *A. ochotensis*).

Comparative Materials

Artediellus ochotensis. Four males and 6 females: HUMZ 77920, 98291, 98296, 98306, 98307, 98317, 98319, 102299, 102300, and 102324. 71.0–84.3 mm SL.

Artediellus camchaticus. Four females: HUMZ 55085, 55093, 55094, and 55096. 95.6–113.2 mm SL.

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Literature Cited

- Andriashev, A. P. 1961. Revision of the hooked horn sculpin genus *Artediellus* Jord. (Pisces, Cottidae) of the Bering Sea. Vopr. Iktiolog., 1: 231–242. (In Russian.)
 Amaoka, K., K. Nakaya and M. Yabe. 1989. Fishes of Usujiri and adjacent waters in southern Hokkaido, Japan. Bull. Fac. Fish. Hokkaido Univ., 40: 254–277.
 Gilbert, C. H. and C. V. Burke. 1912. Fishes from Bering Sea and Kamchatka. Bull. U. S. Bur. Fish., 30: 31–96.
 Hubbs, C. L. and K. F. Lagler. 1958. Fishes of the Great Lakes region. Bull. Cranbrook Inst. Sci., 26: 1–213.
 Nelson, D. W. 1986. Two new species of the cottid genus *Artediellus* from the western north Pacific Ocean and the Sea of Japan. Proc. Acad. Nat. Sci. Philad., 138: 33–45.
 Neyelov, A. V. 1979. Seimosensory system and the classification of sculpins (Cottidae: Myoxocephalinae, Artediellinae). Zool. Inst., Akad. NAUK. USSR, Leningrad. 208 pp. (In Russian.)
 Schmidt, P. Yu. 1927. A revision of the cottoid fishes of the genus *Artediellus*. Proc. U. S. Natl. Mus., 71: 1–10.
 Yabe, M. 1991. *Bolinia euryptera*, a new genus and species of sculpin (Scorpaeniformes: Cottidae) from the Bering Sea. Copeia, 1991: 329–339.

北海道の渡島半島南西部沿岸から採集されたカジカ科の 1 新種オシマオキカジカ

武藤文人・矢部 衛・尼岡邦夫

北海道の渡島半島南西部の津軽海峡東部及び南茅部沖の水深 80–137 m から採集された 39 個体 (53.3–91.1 mm SL) に基づき、カジカ科オキカジカ属の 1 種 *Artediellus neyelovi* オシマオキカジカを記載した。本種は頭部および体の前部に多くの皮弁を持つことでオホツクカジカ *A. ochotensis* に類似するが、後種とは頭部側線系の孔が多いこと、第 1 背鰭の高いことなどで識別される。また本種は側線孔数が 28 以上であること、および頭部側線系の孔が多いことなどで千島列島のシンシル島の西部のみから知られている *A. ingens* に類似する。しかし、本種は頭部及び体の前方部の皮弁が多いこと、雄の第 1 背鰭の棘が伸長して鰭膜が切れ込んでいること、第 1 背鰭に不規則な斑紋のあること、および臀鰭の褐色横帯が 2–3 本であることで *A. ingens* と識別される。

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